(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 608 039 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
02.09.1998 Bulletin 1998/36

(51) Int Cl.[6]: **G08B 13/24**

(21) Application number: **94200142.1**

(22) Date of filing: **21.01.1994**

(54) A shoplifting detection system, in particular suitable for use in supermarkets, and a shop design comprising such a shoplifting detection system

Ladendiebstahldetektierungssystem, insbesondere geeignet für den Gebrauch in Supermärkten, und ein Ladenentwurf mit solchem System

Système de détection de vol à l'étalage, en particulier pour usage dans les supermarchés, et une conception de magasin pour un tel système

(84) Designated Contracting States:
CH DE FR GB LI NL

(30) Priority: **22.01.1993 NL 9300124**

(43) Date of publication of application:
27.07.1994 Bulletin 1994/30

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(56) References cited:
EP-A- 0 035 660 **WO-A-91/17533**

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Description

The invention relates to a high-frequency type shoplifting detection system. In the prior art shoplifting detection systems a transmitting coil ("transmitting antenna pillar") generates a magnetic alternating field having a varying frequency. This frequency generally lies within the range of from 1 to 10 MHz.

Attached to the goods to be secured are so-called detection labels. These labels, also called wafers, contain a resonance circuit consisting of a coil tuned with a capacitor. They can be designed, e.g., as a flat plastic box containing an air-core coil or as an adhesive label built up with a flat printed coil and a foil capacitor or as a circuit having divided capacity and self-induction or in some other way.

When such a label is brought into the magnetic alternating field of the transmitting coil, at the moments the frequency of the alternating field equals the resonance frequency of the resonance circuit in the detection label, that circuit will absorb energy and co-resonate. This co-resonating causes a field disturbance which can be detected by a receiver circuit which is either connected with the transmitting antenna in a so-called absorption system or coupled with a second (receiving) antenna in a so-called transmission system. These shoplifting detection systems are known, inter alia from applicants' Dutch patent applications 82 02951 and 89 00658. Such detectable field disturbances can be generated by means of magnetic responders, e.g. as described in US patent 4 118 693.

The transmitting/receiving antennas of a complete shoplifting detection system are realized, e.g., in a row of upright or self-supporting antenna coil structures, also called pillars. The transmitting and/or receiving electronics are mostly located somewhere in the pillar, preferably in the foot. These pillars have hitherto been used especially in shops, such as clothes shops, in which the row of pillars is placed just in front of the exit. In such surroundings the pillars are mounted directly to the floor, the direct surroundings of each pillar being free of obstacles. The pillars provided with transmitting antennas generate on both sides a magnetic alternating field. Similarly, the pillars provided with receiving antennas have a sensitivity range extending on both sides of the pillar. In order to make it possible upon detection of a label to find out in the best possible manner who has the detected label on him, a visual signalling device is desirable for each passageway. In a transmission system a label can pass to the left or right of a receiver pillar. The label signal in the receiver is identical in both cases. It makes no difference whether the label is irradiated by the left or by the right transmitter. In order yet to make it possible to distinguish between the left or right passage of a receiver pillar, the two transmitters to the left and right of this pillar, i.e. the even and odd numbered transmitters in the row, are alternately switched on and off: multiplexed.

From the phase of the multiplex signal at the moment of detection of a label, i.e. the signal alternately switching on the even and odd transmitters, it is derived in the receiver whether the label is to the left or right of the antenna. With this information the signalling device belonging to the passageway is controlled. Multiplexing has to take place at a frequency high enough not to adversely affect the reaction speed of the system. In practice, the lower limit is 2 Hz and the upper limit the half sweep frequency (multiplexes per complete sweep period).

Another use of high-frequency type shoplifting detection systems relates to the use in shops designed as supermarkets, in which payment for the goods bought takes place at so-called cash blocks. Cash blocks are mostly constructed by means of metal beams, metal or wooden faces provided with a conveyor belt, a (computer) cash register and sometimes a bar code scanner and/or a pair of scales. In such a cash block a cashier is sitting. The customers will pass in front of the block and put the goods to be paid for on the beginning of the conveyor belt. The belt conveys the goods to the cashier who feeds them into the cash register, optionally with the aid of the bar code scanner, after which payment takes place. In the meantime, the goods have moved further to a place on the cash block behind the cashier, in the direction of the exit of the supermarket. Consequently, a separation takes place between the stream of goods to be paid for and the associated customers. In a typical supermarket situation a series of these cash bloks is lined up in a row. The customers pass between the cash blocks in the direction of the exit. A medium-sized supermarket easily contains more than ten cash blocks. This arrangement is also designated by the term "check-out system". In order to check whether customers passing the cash block take along goods not placed on the belt and therefore not paid for, detection fields are generated in the gangways between the cash blocks. This may be done, e.g., by means of two pillars: a first pillar comprising receiver electronics and a second pillar comprising transmitter electronics. A detection system in this use is preferably built with shielded antennas.

By using antennas shielded on the back with a shield, undesirable electromagnetic coupling between receiving and transmitting antennas and the electric conductors in, on or at the cash block is prevented. Multipath propagation effects and parasitic resonances in constructional parts and cabling in the cash blocks could otherwise give rise to a decreased detection sensitivity and false alarms.

Such shielded antennas are described, e.g., in applicants' international patent application WO 91/17533. These antennas also have the advantage that no label detection takes place at the backside where goods the labels of which have not yet been deactivated pass on the conveyor belt so that no undesirable alarm can be caused. Only at the front of the antenna, in the area

where the customers pass, is a magnetic alternating field generated. Because in this configuration each gangway has a separate detection system of its own, the associated receiver can only receive in this configuration a label signal generated by the field of the associated transmitter. The detection of labels if therefore inherently selective for each passageway, and multiplexing is not necesary.

Thus a configuration is obtained with alternate passage - non-passage (blocking) in which the customers pass through the passageway and the cash blocks form the non-passage or blocking. In the non-passage detection of labels is undesirable.

It has been found that the effect of the shield in a shielded pillar is not perfect. There is always left, through the shield, a remaining coupling of the detection field with conductors present in the cash blocks.

A further drawback of the prior art detection system is that for each cash block separate electronic units are necessary to activate the different antennas of the detection system, which makes the prior art device relatively complicated and expensive.

The objects of the invention is to remove the above drawbacks and generally to provide an improved, efficient and reliably operating shoplifting detection system which is particularly suitable for use in shops designed as supermarkets.

According to the invention a shoplifting detection system, in particular suitable for use in shops arranged as a supermarket, wherein a plurality of passageways (d1-d7) separated from each other by obstacles (1a-1d) are provided, said obstacles including a plurality of cash blocks, and wherein suitable transmitting antennas (8) are arranged for generating in said passageways a magnetic detection field, and receiving antennas (7), for detection of a responder disturbing a detection field, transmitting units (18a,18b) and receiving (17) units being provided which are connected with the transmitting antennas (8) and the receiving antennas (7) is characterized in that each obstacle (1a-1d) placed between two adjacent passageways (d1-d7) either has antennas (7) of the receiving antenna type or antennas (8) of the transmitting antenna type provided at both sides of said obstacle and in that adjacent obstacles (1a-1d) separated by a passageway (d1-d7) have different types (receiving or transmitting) antennas (7,8).

It is noted that EP-A-0 035 660 discloses a shoplifting detection system suitable for operating two adjacent passageways in which an electro-magnetic detection field is generated. However this prior art system is only suitable for two directly adjacent pasages for which a single common receiver antenna is placed between said passages and two transmitter antennas are placed opposite said single receiver antenna and driven in a multiplex manner. As the present invention does relate to adjacent passageways which are separated by obstacles like for instance check-out desks, a combination of antennas for two different passageways is not possible. Therefore this prior art system is not suitable for use in a situation wherein passageways are separated by obstacles.

In the following paragraphs the invention will be described in more detail with reference to the accompanying drawings. In these drawings:

Fig. 1 is a diagrammatic top plan view of a check-out system of a supermarket provided with a shoplifting detection system according to the prior art;
Fig. 2 is a diagrammatic top plan view of an example of a first embodiment of a check-out system provided with a shoplifting detection system according to the invention;
Fig. 3 is a diagrammatic representation of an example of a further elaboration of the inventive concept; and
Fig. 4 is a diagrammtic representation of another example of a furthr elaboration on the inventive concept.

Fig. 1 is a diagrammatic representation of an example of a check-out system as often used in shops designed as supermarkets, e.g. food shops. The check-out system shown comprises a plurality of juxtaposed cash blocks 1a through 1d. Located between each pair of juxtaposed cash blocks is a gangway 9a through 9d, via which the customers can go to the exit, after having paid for the selected goods at the cash desk. The cash blocks may be constructed in different ways. In the example shown the cash blocks comprise a conveyor belt 2, a (computer) cash register 3, a bar code scanner and/or a pair of scales 5 and a seat 4 for the cash personnel. In operation, there is generated in the gangway between two cash blocks a detection field capable of detecting electronic or magnetic responders attached to the shop goods when the shop goods are conveyed through the gangway instead of via the conveyor belt past the cash personnel.

In the meantime shown the detection field is generated by means of antennas 6 arranged on both sides of each gangway. The antennas are mostly accommodated in an antenna pillar disposed against a cash block or (partly) put into a recess in a cash block. The antennas are preferably shielded from the associated cash block. The figure shows on both sides of each cash block a receiving antenna 7 and a transmitting antenna 8. In the foot of the antenna pillar or in the cash block there are further disposed a transmitting unit and a receiving unit connected with respectively the receiving antenna and the transmitting antenna.

As a result of this configuration there are also disposed on both sides of each gangway a transmitting antenna 8 and a receiving antenna 7 as shown in Fig. 1. Since each receiving antenna is connected with a separate associated receiver not connected with other receiving antennas, it is always certain upon detection of a label in which passageway detection took place.

Some sensitivity to false alarm, however, may continue to exist, even when shielded antennas are used as described in WO 91/17533.

According to the invention the sensitivity of a check-out system to the remaining undesirable effects of a multipath propagation caused by, inter alia, coupling of transmitters, via conductors and apparatuses, with receivers on the other side of a cash block, and by parasitic resonances of conductors in the cash blocks can be further reduced. To this end, according to the invention the same pillar type is mounted on both sides of a cash block: alternately, therefore, two transmitter pillars or two receiver pillars for each cash desk. The detection range and the sensitivity to undesirable coupling via the cash block between two pillars of the same type are much lower than between a transmitter and a receiver pillar. Consequently, labelled goods on the conveyor belt of the cash block give less cause to false alarm.

An example of a check-out system thus designed is diagrammatically shown in Fig. 2. Cash block 1a is provided on both sides with receiving antennas, cash block 1b with transmitting antennas etc.

According to the present state of the art, each antenna in a check-out system is connected with the transmitter or receiver electronics belonging to that antenna, which electronics may or may not be mounted in the antenna pillar.

It is also possible to connect the shielded antennas with a coaxial cable 11 to the associated receiving or transmitting unit 17 or 18, which is then accommodated in a separate box outside the pillars as also shown in Fig. 2. When a check-out system is thus constructed with alternately two transmitting or two receiving antennas for each cash block, a cash block therefore contains alternately two transmitter and receiver electronics units.

According to a further elaboration on the inventive concept a strong simplification may be realized by arranging instead of two electronics units of the transmitter or receiver type for each cash block only one electronics unit which is connected to the two antennas on both sides of the cash block. The electronics units may be interconnected via cables 12. Such a configuration is diagrammatically shown in Fig. 2. Cash blocks 1a and 1c are each provided with a receiving unit 17 connected via coaxial cables 11 with the receiving antennas 7, and cash blocks 1b and 1d are each provided with a transmitting unit 18 connected via coaxial cables 11 with the two transmitting antennas 8 of each cash block. Practical examples are diagrammatically shown in Fig. 3 and Fig. 4.

In the simplest embodiment (schematic diagram in Fig. 3) the two antennas 6 with the shielding 10 of a cash block 1 are parallel connected to the corresponding electronics unit 17 or 18, e.g. via a coupling transformer, a power splitter/combiner 13 or a directional coupling. By multiplexing the transmitting units 18a, 18b, i.e. alternately switching them on by means of suitable control means, according to the principle described for a detached row of pillars, simultaneous detection is realized in the passageways on both sides of the cash blocks with a transmitting unit, cash blocks with switched-on and -off transmitters alternating with each other. When the passageways are consecutively numbered according to the series d1, d2, d3, d4, d5 etc., the detection is alternately switched on in the passageways d2, d3, d6, d7, d10 etc. or in the passageways d1, d4, d5, d8, d9, etc.

From the phase of the multiplex signal it is derived with suitable phase detection means in the receivers in which passageway detection takes place. With this information the signalling device belonging to the passageway is controlled. The detection in the passageways is therefore alternately switched on two by two.

This embodiment results in some electric losses caused by the parallel connection of two antennas via an impedance transformer which becomes evident in a decrease of detection sensitivity of 2 x 3 dB.

Multiplexing the transmitters themselves, like in a detached row of pillars, has the result that they are switched on only half the time. Consequently, the amount of label information per time unit is not maximal. This results in a slightly decreased reaction speed or sensitivity. In practice, this effect is hardly noticeable.

These losses are avoided in the preferred embodiment shown in Fig. 4. Fig. 4 shows a schematic diagram. In this variant a preferably electronic switch member 14 or 15 is interposed between two antennas 6 and a transmitting unit 18 or receiving unit 17. The switch member behaves like a rapid relay with a change-over contact and may be realized , e.g., with PIN diodes or FET as a switch member. At low multiplex frequences an electromechanical relay is also possible. The switch member takes the place of the coupling transformer 13 which is used for parallel connection of two antennas.

Thus it is realized that alternately only those antennas are connected through which are actively used for detection. This avoids the losses caused by the parallel connected antenna which at that moment does not participate in the detection. Also, the transmitters are continuously switched on.

The performance of a system built up in this manner is comparable to that of a detached row of pillars in which multiplexing is effected by alternately switching on the even and odd transmitters. However, the number of electronics units has now been halved. In this variant multiplexing is effected between even and odd passageways to the left and right beside each cash desk and not between the passageways two by two as in the variant without antenna change-over switches. This is not essential to the operation of a system.

In principle, it is also possible to multiplex more than two-fold, e.g. 4-fold. This saves additional transmitters and receivers. In practice, however, this is at the expense of the reaction speed and the sensitivity of the system. The requirements with respect to reaction

speed and sensitivity set a lower limit to the time a label signal of minimum strength must be present to enable reliable detection. Also, complicated cabling would be necessary.

Depending on the width of a passageway and the quality of the labels used, cost price and system performance may be balanced against each other.

It is observed that after the foregoing various modifications are obvious to those skilled in the art. Thus, the invention can also be applied without co-using shielded antennas. Moreover, the invention is applicable if in the space between two passageways no detection of responders is desirable or if the space between two passageways is blocked by a blocking element other than a cash block. For instance, on both sides of a constructional pillar there can also be mounted and energized two antennas of the same type as described in the foregoing.

Similarly, in the embodiment of Fig.4 the receivers or the transmitters or both (as shown) can be controlled according to a multiplex system.

It is also possible to multiplex the receiving units. When, e.g., the system of Fig. 3 is used for two passageways, a transmitting unit like 18a can be used with on both sides an obstacle having a receiving unit. In that case the transmitting unit could be switched on continuously, while the receiving units are switched on and off alternately.

The shields 10 shown in the figures may comprise panels of metal gauze or other suitable shielding members.

These and similar modifications are considered to fall within the scope of the invention.

Claims

1. A shoplifting detection system, in particular suitable for use in shops arranged as a supermarket, wherein a plurality of passageways (d1-d7) separated from each other by obstacles (1a-1d) are provided, said obstacles including a plurality of cash blocks, and wherein suitable transmitting antennas (8) are arranged for generating in said passageways a magnetic detection field, and receiving antennas (7) for detection of a responder disturbing a detection field, transmitting units (18a,18b) and receiving (17) units being provided which are connected with the transmitting antennas (8) and the receiving antennas (7), **characterized in that** each obstacle (1a-1d) placed between two adjacent passageways (d1-d7) either has antennas (7) of the receiving antenna type or antennas (8) of the transmitting antenna type provided at both sides of said obstacle and in that adjacent obstacles (1a-1d) separated by a passageway (d1-d7) have different types (receiving or transmitting) antennas (7,8).

2. A shoplifting detection system according to claim 1, **characterized in that** at least one set of antennas (7,8) of the same type belonging to one and the same obstacle (1a-1d) is connected with an electronics unit common to said set of antennas and operating as a transmitting unit (18) or receiving unit (17).

3. A shoplifting detection system according to claim 2, **characterized in that** a series of interspaced, juxtaposed obstacles (1a-1d) is alternately provided with a common transmitting unit (18) for the antennas (8) belonging to the obstacle or a common receiving unit (17) for the antennas (7) belonging to the associated obstacle.

4. A shoplifting detection system according to claim 2 or 3, **characterized in that** the common electronics units (17,18) are connected via a coupling (13) uninterrupted in time with the associated antennas (7,8) located on both sides of the associated obstacle (1a-1d).

5. A shoplifting detection system according to claim 4, **characterized in that** at least two successive transmitting units (18a,18b) are connected with control means which by means of multiplex signal alternately switch on and off successive transmitting units (18a,18b).

6. A shoplifting detection system according to any of claims 2-5, **characterized in that** at least two successive receiving units (17) are connected with control means which by means of a multiplex signal alternately switch on and off successive receiving units (17).

7. A shoplifting detection system according to claim 2 or 3, **characterized in that** of the common electronics units at least the transmitting units (18a,18b) or at least the receiving units (17) or both the transmitting and the receiving units are connected via controllable change-over switches (14,15) alternately in time with the antenna placed on one or the other side of the associated obstacle (1a-1d).

8. A shoplifting detection system according to claim 7, **characterized in that** juxtaposed transmitting (18) and recieving (17) units are alternately connected with the antennas placed opposite each other in a passageway (d1-d7) between two obstacles (1a-1d) or with the antennas placed on the sides of the obstacles (1a-1d) facing away from each other.

9. A shoplifting detection system according to any of the preceding claims, **characterized in that** at least a plurality of antennas (6) are provided with shielding means (10) which electrically shield the anten-

nas (6) from the obstacles (1a-1d) beside which the antennas are placed.

10. A shoplifting detection system according to claim 11, **characterized in that** the shielding means (10) comprise panels of metal gauze.

11. A shop arrangement including a plurality of passageways (d1-d7) separated from each other by obstacles (1a-1d), said obstacles including a plurality of cash blocks and, **characterized by** a shoplifting detection system comprising transmitting antennas (8) for generating in said passageways a magnetic detection field for responders associated with articles on sale in the shop, and receiving antennas (7) for detection of responders in said passageways as claimed in any one of claims 1-10.

12. A cash block for use in a shop arrangement as claimed in claim 11, **characterized in that** said cash block (1a-1d) has a single electronics unit designed either as a transmitting unit (18) or a receiving unit (17) and which is connected with corresponding transmitting antennas (8) or receiving antennas (7) at either side of the cash block (1a-1d).

Patentansprüche

1. Ladendiebstahlerkennungssystem, insbesondere geeignet zur Verwendung in Läden, die als Supermarkt aufgebaut sind, wobei mehrere durch Hindernisse (1a-1d) voneinander getrennte Durchgänge (d1-d7) vorgesehen sind, wobei die Hindernisse mehrere Kassenblöcke aufweisen, und wobei geeignete Sendeantennen (8) zum Erzeugen eines magnetischen Detektionsfeldes in den Durchgängen und Empfangsantennen (7) zum Erkennen eines ein Detektionsfeld störenden Responders angeordnet sind, wobei Sendeeinheiten (18a, 18b) und Empfangseinheiten (17) vorgesehen sind, die mit den Sendeantennen (8) und den Empfangsantennen (7) verbunden sind, dadurch gekennzeichnet, daß jedes zwischen zwei benachbarten Durchgängen angeordnete Hindernis (1a-1d) entweder Antennen (7) des Empfangsantennentyps oder Antennen (8) des Sendeantennentyps aufweist, die auf beiden Seiten des Hindernisses angeordnet sind, und daß durch einen Durchgang (d1-d7) getrennte, benachbarte Hindernisse (1a-1d) unterschiedliche Arten von Antennen (Empfangs- oder Sendeantennen) (7, 8) aufweisen.

2. Ladendiebstahlerkennungssystem nach Anspruch 1, dadurch gekennzeichnet, daß wenigstens eine Gruppe von Antennen (7, 8) des selben Typs, die zu ein und demselben Hindernis (1a-1d) gehört, mit einer Elektronikeinheit verbunden ist, die der Gruppe von Antennen gemeinsam ist, und die als Sendeeinheit (18) oder Empfangseinheit (17) arbeitet.

3. Ladendiebstahlerkennungssystem nach Anspruch 2, dadurch gekennzeichnet, daß eine Reihe beabstandeter, benachbarter Hindernisse (1a-1d) abwechselnd mit einer gemeinsamen Sendeeinheit (18) für die zu dem Hindernis gehörenden Antennen (8) oder einer gemeinsamen Empfangseinheit (17) für die zu dem zugeordneten Hindernis gehörenden Antennen (7) versehen ist.

4. Ladendiebstahlerkennungssystem nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß die gemeinsamen Elektronikeinheiten (17, 18) über eine Kopplung (13) zeitlich ununterbrochen mit den zugehörigen Antennen (7, 8) auf beiden Seiten des zugehörigen Hindernisses (1a-1d) verbunden sind.

5. Ladendiebstahlerkennungssystem nach Anspruch 4, dadurch gekennzeichnet, daß wenigstens zwei aufeinanderfolgende Sendeeinheiten (18a, 18b) mit einer Steuereinrichtung verbunden sind, die durch ein Multiplexsignal aufeinanderfolgende Sendeeinheiten (18a, 18b) abwechselnd ein- und ausschaltet.

6. Ladendiebstahlerkennungssystem nach einem der Ansprüche 2-5, dadurch gekennzeichnet, daß wenigstens zwei aufeinanderfolgende Empfangseinheiten (17) mit einer Steuereinrichtung verbunden sind, die durch ein Multiplexsignal aufeinanderfolgende Empfangseinheiten (17) abwechselnd ein- und ausschaltet.

7. Ladendiebstahlerkennungssystem, nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß von den gemeinsamen Elektronikeinheiten wenigstens die Sendeeinheiten (18a, 18b) oder wenigstens die Empfangseinheiten (17) oder sowohl die Sende-, als auch die Empfangseinheiten über steuerbare Wechselschalter (154, 15) zeitlich abwechselnd mit der auf der einen oder der anderen Seite des zugeordneten Hindernisses (1a-1d) angeordneten Antenne verbunden sind.

8. Ladendiebstahlerkennungssystem nach Anspruch 7, dadurch gekennzeichnet, daß benachbarte Sende- (18) und Empfangseinheiten (17) abwechselnd mit den einander in einem Durchgang (d1-d7) zwischen zwei Hindernissen (1a-1d) gegenüberliegenden Antennen oder mit den Antennen auf den voneinander abgewandten Seiten der Hindernisse (1a-1d) verbunden sind.

9. Ladendiebstahlerkennungssystem nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß wenigstens mehrere Antennen (6) mit

einer Abschirmeinrichtung (10) versehen sind, welche die Antennen (6) gegen die Hindernisse (1a-1d) abschirmt, neben denen sie angeordnet sind.

10. Ladendiebstahlerkennungssystem nach Anspruch 9, dadurch gekennzeichnet, daß die Abschirmeinrichtung (10) Bahnen aus Metallgaze aufweist.

11. Ladenanordnung mit mehreren Durchgängen (d1-d7), die voneinander durch Hindernisse (1a-1d) getrennt sind, welche mehrere Kassenblöcke aufweisen, und gekennzeichnet durch ein Ladendiebstahlerkennungssystem nach einem der Ansprüche 1-10, mit Sendeantennen (8), die in den Durchgängen ein magnetisches Detektionsfeld für mit im Laden zum Verkauf stehenden Artikeln verbundene Responder erzeugen, und Empfangsantennen (7) zum Erkennen von Respondern in den Durchgängen.

12. Kassenblock zur Verwendung in einer Ladenanordnung nach Anspruch 11, dadurch gekennzeichnet, daß der Kassenblock (1a-1d) eine einzige Elektronikeinheit aufweist, die entweder als Sendeeinheit (18) oder Empfangseinheit (17) ausgebildet ist, und die mit entsprechenden Sendeantennen (8) oder Empfangsantennen (7) auf beiden Seiten des Kassenblocks (1a-1d) verbunden ist.

Revendications

1. Système de détection de vol à l'étalage, convenant en particulier pour être utilisé dans des magasins agencés en supermarchés, dans lequel une pluralité de passages (d1-d7) séparés l'un de l'autre par des obstacles (1a-1d) sont formés, lesdits obstacles comprenant une pluralité de caisses de paiement, et dans lequel des antennes d'émission appropriées (8) sont disposées pour générer dans lesdits passages un champ de détection magnétique, et des antennes de réception (7) destinées à détecter un répondeur perturbant un champ de détection, des dispositifs d'émission (18a, 18b) et des dispositifs de réception (17) étant présents et étant reliés aux antennes d'émission (8) et aux antennes de réception (7), caractérisé en ce que chaque obstacle (1a-1d) placé entre deux passages adjacents (d1-d7) comporte soit des antennes (7) du type antenne de réception, soit des antennes (8) du type antenne d'émission, de part et d'autre dudit obstacle, et en ce que les obstacles adjacents (1a-1d) séparés par un passage (d1-d7) comportent des types différents d'antennes (7,8) (réception ou émission).

2. Système de détection de vol à l'étalage selon la revendication 1, caractérisé en ce qu'au moins un ensemble d'antennes (7,8) du même type appartenant à un seul et même obstacle (1a-1d) est relié à un dispositif électronique commun audit ensemble d'antennes et fonctionnant comme un dispositif d'émission (18) ou un dispositif de réception (17).

3. Système de détection de vol à l'étalage selon la revendication 2, caractérisé en ce qu'une série d'obstacles (1a-1d), juxtaposés et espacés les uns des autres, sont pourvus de façon alternée d'un dispositif d'émission commun (18) pour les antennes (8) appartenant à l'obstacle ou d'un dispositif de réception commun (17) pour les antennes (7) appartenant à l'obstacle associé.

4. Système de détection de vol à l'étalage selon la revendication 2 ou 3, caractérisé en ce que les dispositifs électroniques communs (17, 18) sont reliés, via un moyen de couplage (13), en permanence aux antennes associées (7, 8) placées de part et d'autre de l'obstacle associé (1a-1d).

5. Système de détection de vol à l'étalage selon la revendication 4, caractérisé en ce qu'au moins deux dispositifs d'émission successifs (18a, 18b) sont reliés à un moyen de commande qui, à l'aide d'un signal multiplex, met alternativement en circuit et hors circuit les dispositifs d'émission successifs (18a, 18b).

6. Système de détection de vol à l'étalage selon l'une quelconque des revendications 2-5, caractérisé en ce qu'au moins deux dispositifs de réception successifs (17) sont rekués au moyen de commande qui, à l'aide d'un signal multiplex, met alternativement en circuit et hors circuit les dispositifs de réception successifs (17).

7. Système de détection de vol à l'étalage selon la revendication 2 ou 3, caractérisé en ce que, parmi les dispositifs électroniques communs, au moins les dispositifs d'émission (18a, 18b) ou au moins les dispositifs de réception (17) ou à la fois les dispositifs d'émission et les dispositifs de réception sont reliés, via des commutateurs commandables (14, 15), alternativement à l'antenne placée sur l'un ou l'autre côté de l'obstacle associé (1a-1d).

8. Système de détection de vol à l'étalage selon la revendication 7, caractérisé en ce que les dispositifs juxtaposés d'émission (18) et de réception (17) sont alternativement reliés aux antennes placées l'une en face de l'autre dans un passage (d1-d7) entre deux obstacles (1a-1d) ou aux antennes placées de part et d'autre des obstacles (1a-1d) en étant orientées en sens opposé l'une par rapport à l'autre.

9. Système de détection de vol à l'étalage selon l'une

quelconque des revendications précédentes, caractérisé en ce qu'au moins une pluralité d'antennes (6) sont munies d'un moyen de protection (10) qui protège électriquement les antennes (6) vis-à-vis des obstacles (1a-1d) à côté desquels les antennes sont placées.

10. Système de détection de vol à l'étalage selon la revendication 11, caractérisé en ce que le moyen de protection (10) comprend des panneaux en toile métallique.

11. Agencement de magasin comprenant une pluralité de passages (d1-d7) séparés l'un de l'autre par des obstacles (1a-1d), lesdits obstacles comprenant une pluralité de caisses de paiement, caractérisé par un système de détection de vol à l'étalage comprenant des antennes d'émission (8) destinées à générer dans lesdits passages un champ de détection magnétique pour des répondeurs associés à des articles en vente dans le magasin, et des antennes de réception (7) destinées à la détection des répondeurs dans lesdits passages, selon l'une quelconque des revendications 1-10.

12. Caisse de paiement destinée à être utilisée dans un agencement de magasin selon la revendication 11, caractérisée en ce que ladite caisse de paiement (1a-1d) comporte un seul dispositif électronique conçu soit comme un dispositif d'émission (18), soit comme un dispositif de réception (17) et qui est relié à des antennes d'émission (8) ou des antennes de réception (7) correspondantes, de part et d'autre de la caisse de paiement (1a-1d).

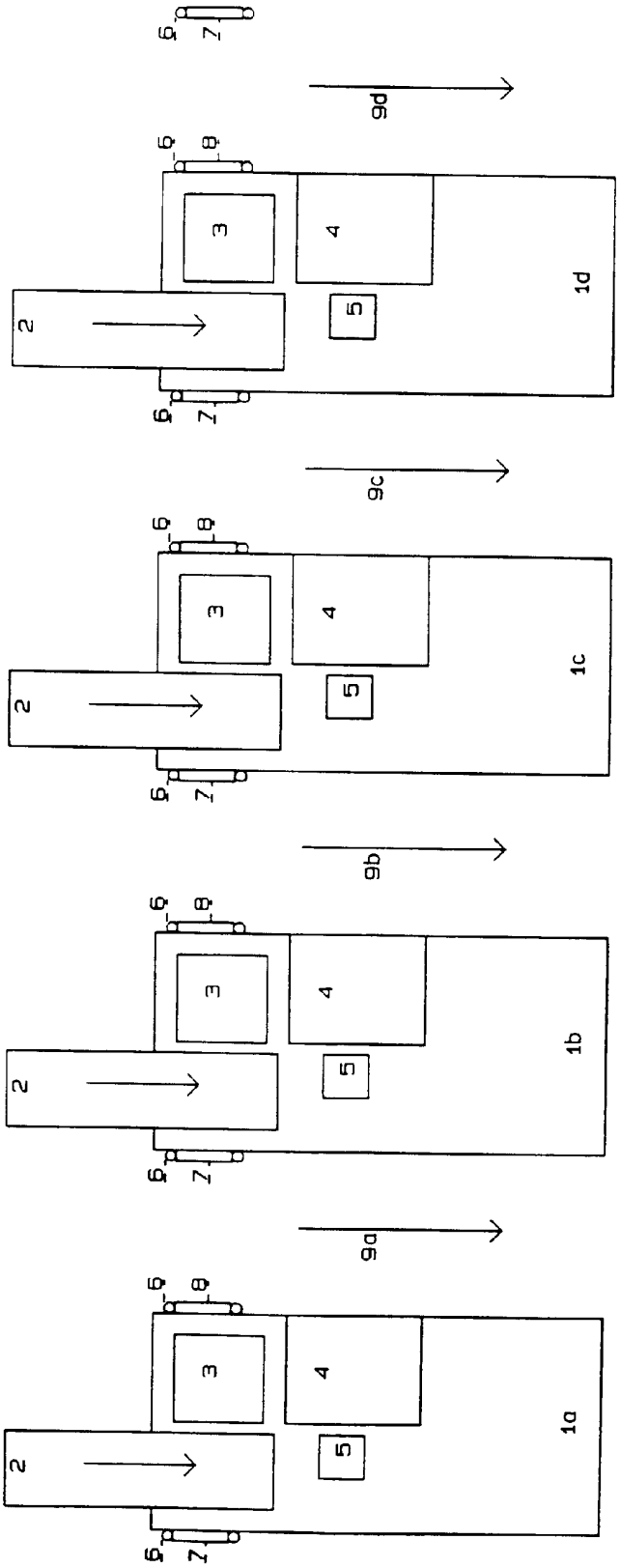
9
7
9d
9
8
3
4
1d
2
5
6
7
9
9c
9
8
3
4
1c
2
5
6
7
9
9b
9
8
3
4
1b
2
5
6
7
9
9a
9
8
3
4
1a
2
5
6
7
9

FIG.1

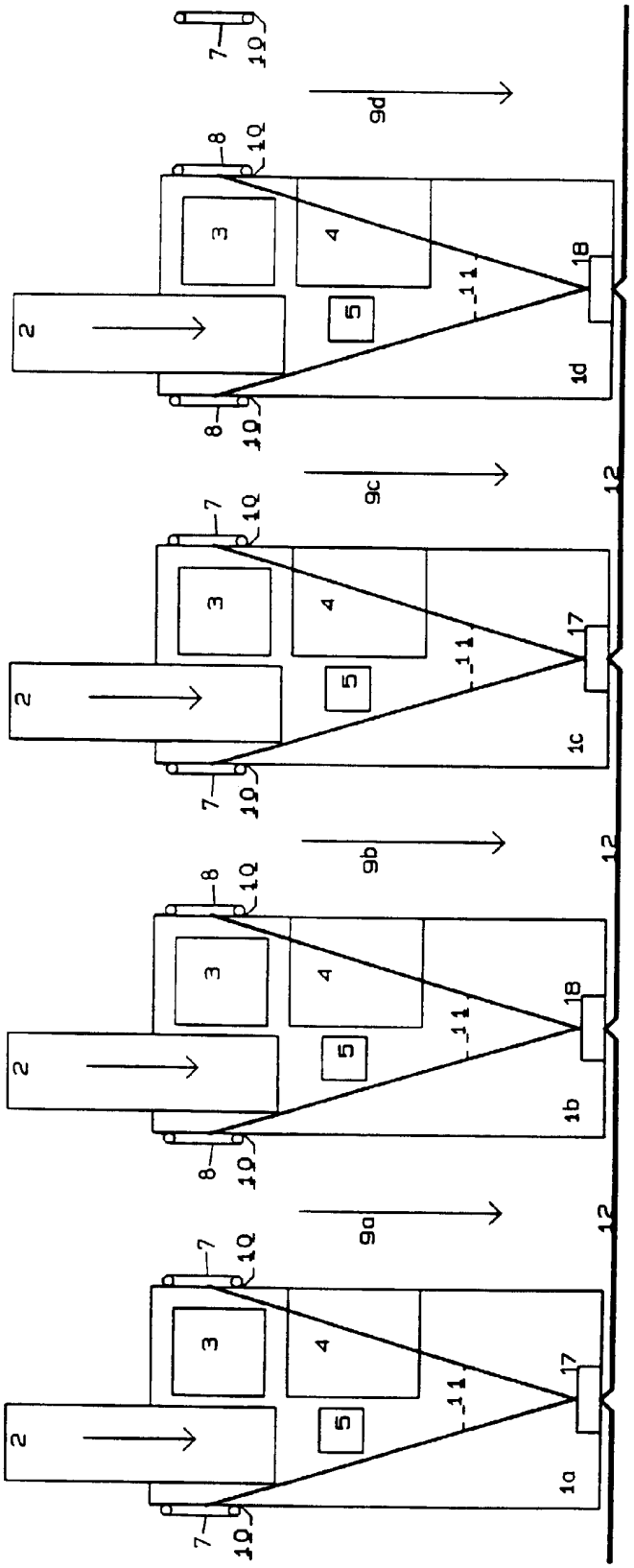

FIG. 2

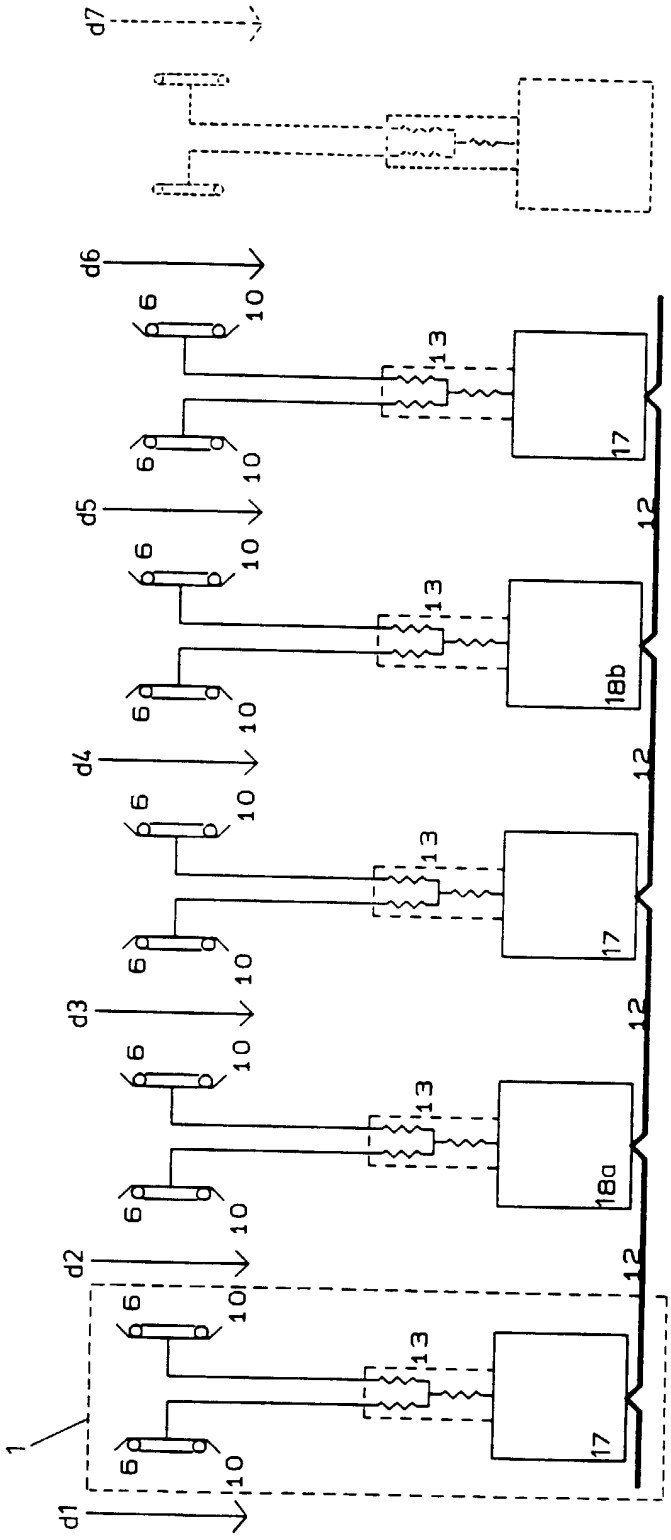

FIG.3

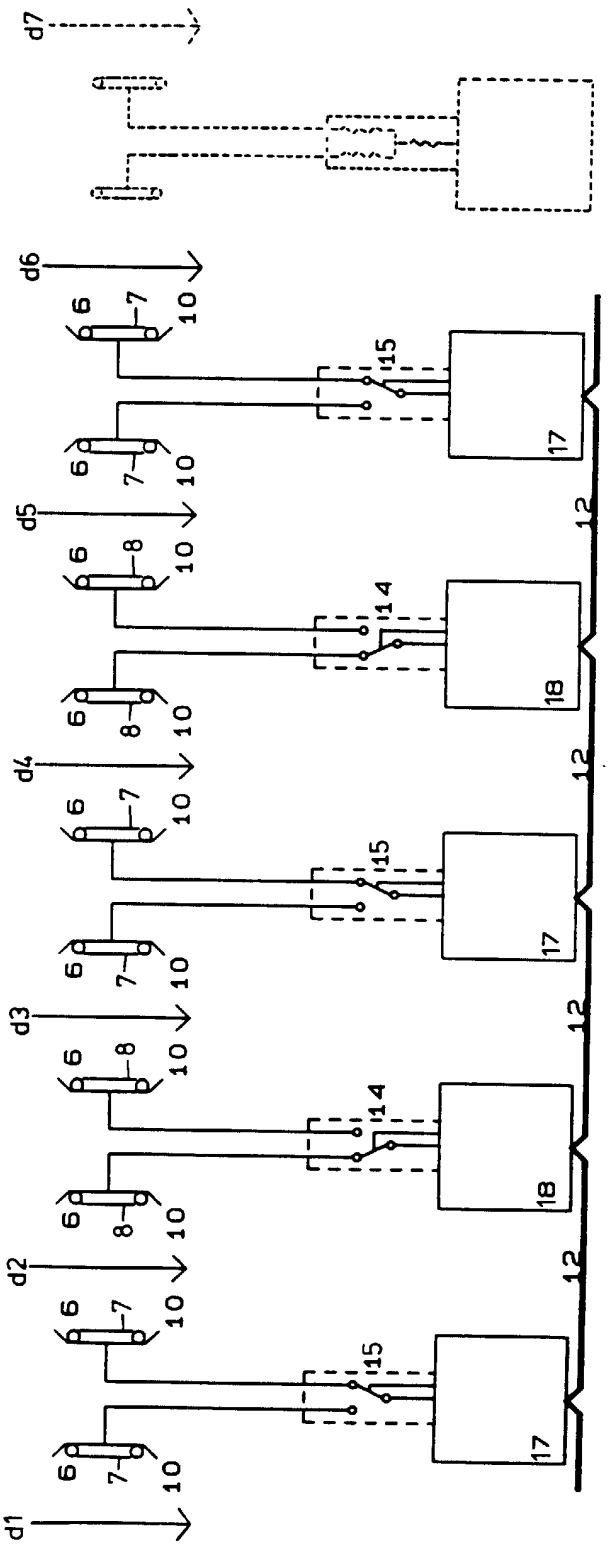

FIG.4